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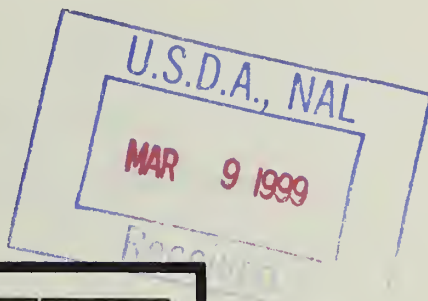


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**UNITED STATES
STANDARDS**
for grades of
**CONCENTRATED
GRAPEFRUIT JUICE**
for
MANUFACTURING



EFFECTIVE MARCH 20, 1957

First Issue

100-21
page 8 94M

This is the first issue of the United States Standards for Grades of Concentrated Grapefruit Juice for Manufacturing. These standards are issued by the Department after careful consideration of all data and views submitted. They were published in the Federal Register of March 20, 1957 (22 F.R. 1797), and became effective on publication. Section 52.3491 was amended (22 F.R. 3535) to become effective July 1, 1957.

As in the case of other standards for processed fruits and vegetables, these standards are designed to serve as a convenient basis for sales, for establishing quality control programs, and for determining loan values. They will also serve as a basis for the inspection of this commodity by Federal inspection service, which is available for the inspection of other processed products as well.

The Department welcomes suggestions which might aid in improving these standards in future revisions. Comments may be submitted to, and copies of these standards obtained from:

Chief, Processed Products Standardization
and Inspection Branch
Fruit and Vegetable Division
Agricultural Marketing Service
United States Department of Agriculture
Washington 25, D. C.

UNITED STATES STANDARDS FOR GRADES OF CONCENTRATED GRAPEFRUIT JUICE FOR MANUFACTURING¹

Effective March 20, 1957

PRODUCT DESCRIPTION, AND GRADES

- Sec.
52.3481 Product description.
52.3482 Grades of concentrated grapefruit juice for manufacturing.

FILL OF CONTAINER

- 52.3483 Recommended fill of container.

FACTORS OF QUALITY

- 52.3484 Ascertaining the grade.
52.3485 Ascertaining the rating for the factors which are scored.
52.3486 Color.
52.3487 Defects.
52.3488 Flavor.

EXPLANATIONS AND METHODS OF ANALYSES

- 52.3489 Explanation of terms and analyses.

SCORE SHEET

- 52.3490 Score sheet for concentrated grapefruit juice for manufacturing.

LOT INSPECTION AND CERTIFICATION

- 52.3491 Ascertaining the grade of a lot.

AUTHORITY: §§ 52.3481 to 52.3491 issued under sec. 205, 60 Stat. 1090, as amended, 7 U. S. C. 1624.

PRODUCT DESCRIPTION, AND GRADES

§ 52.3481 *Product description.* "Concentrated grapefruit juice for manufacturing" is the concentrated product obtained from sound, mature grapefruit (*Citrus paradisi*). The fruit is prepared by sorting and by washing prior to extraction of the juice and the extracted juice is concentrated. The concentrated

grapefruit juice is processed in accordance with good commercial practice; and may or may not require processing by heat, subsequent refrigeration, or freezing to assure preservation of the product but is not the product known as "frozen concentrated grapefruit juice." The finished product does not contain any additives except that cold-pressed oil to standardize flavor and chemical preservatives permissible under provisions of the Federal Food, Drug, and Cosmetic Act may have been added.

(a) The Brix value of the finished concentrate shall comply with the following for the dilution factors indicated:

Dilution factor	Brix value of the finished concentrate	
	Minimum Brix value	Maximum Brix value
	<i>Degrees</i>	<i>Degrees</i>
1 plus 3.....	37.5	40.1
1 plus 4.....	45.5	48.3
1 plus 5.....	52.7	56.0
1 plus 6.....	59.6	63.2

(b) Concentrated grapefruit juice for manufacturing of other dilution factors than "1 plus 3" to "1 plus 6," as indicated in paragraph (a) of this section, shall result in a Brix (upon reconstitution as prescribed by the processor or as prescribed by the label on the container, if labeled) of not less than 10.5 degrees.

§ 52.3482 *Grades of concentrated grapefruit juice for manufacturing.* (a) "U. S. Grade A for Manufacturing" or "U. S. Fancy for Manufacturing" is the quality of concentrated grapefruit juice which shows no material gelation, reconstitutes properly, and of which the reconstituted juice possesses a reasonably

¹ Compliance with these standards does not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act, or with applicable State laws and regulations.

good color; is practically free from defects; possesses a reasonably good flavor; and scores not less than 85 points when scored in accordance with the scoring system outlined in this subpart.

(b) "U. S. Grade C for Manufacturing" or "U. S. Standard for Manufacturing" is the quality of concentrated grapefruit juice which shows no serious gelation, reconstitutes properly, and of which the reconstituted juice possesses a fairly good color; is fairly free from defects; possesses a fairly good flavor; and scores not less than 70 points when scored in accordance with the scoring system outlined in this subpart.

(c) "Substandard for Manufacturing" is the quality of concentrated grapefruit juice that fails to meet the requirements of U. S. Grade C for Manufacturing or U. S. Standard for Manufacturing.

FILL OF CONTAINER

§ 52.3483 *Recommended fill of container.* The recommended fill of container is not incorporated in the grades of the finished product since fill of container, as such, is not a factor of quality for the purposes of these grades. It is recommended that each container be filled with concentrated grapefruit juice as full as practicable without impairment of quality.

FACTORS OF QUALITY

§ 52.3484 *Ascertaining the grade—*

(a) *General.* The grade of concentrated grapefruit juice for manufacturing is ascertained by examining the concentrate and the reconstituted juice; and in addition to considering other requirements outlined in the standards, the following quality factors are evaluated:

(1) *Factors not rated by score points.*
(i) Degree of gelation.

(ii) Faculty of reconstituting properly.

(2) *Factors rated by score points.* The relative importance of each factor which is scored is expressed numerically on the scale of 100. The maximum number of points that may be given such factors are:

Factors:	Points
Color	20
Defects	40
Flavor	40
Total score	100

§ 52.3485 *Ascertaining the rating for the factors which are scored.* The essential variations within each factor which is scored are so described that the value may be ascertained for each factor and expressed numerically. The numerical range within each factor which is scored is inclusive. (For example, "17 to 20 points" means 17, 18, 19, or 20 points.)

§ 52.3486 *Color—*(a) *(A-Mfg.) classification.* Concentrated grapefruit juice of which the reconstituted juice possesses a reasonably good color may be given a score of 17 to 20 points. "Reasonably good color" means that the color is reasonably bright and typical of properly processed and properly concentrated grapefruit juice and is practically free from browning due to scorching, oxidation, caramelization, or other causes.

(b) *(C-Mfg.) classification.* If the reconstituted juice possesses a fairly good color a score of 14 to 16 points may be given. Concentrated grapefruit juice that falls into this classification shall not be graded above U. S. Grade C for Manufacturing or U. S. Standard for Manufacturing, regardless of the total score for the product (this is a limiting rule). "Fairly good color" means that the color may be only fairly bright and is typical of concentrated grapefruit juice that is reasonably free from browning due to scorching, oxidation, caramelization, or other causes.

(c) *(SStd-Mfg.) classification.* Concentrated grapefruit juice that fails to meet the requirements of paragraph (b) of this section may be given a score of 0 to 13 points and shall not be graded above Substandard for Manufacturing, regardless of the total score for the product (this is a limiting rule).

§ 52.3487 *Defects—*(a) *General.* The factor of defects refers to the degree of freedom from juice cells and pulp and from seeds or portions thereof, dark specks, and other defects in the reconstituted juice.

(b) *(A-Mfg.) classification.* Concentrated grapefruit juice of which the reconstituted juice is practically free from defects may be given a score of 34 to 40 points. "Practically free from defects"

means that there may be present:

(1) Juice cells only in such amounts as do not materially detract from the appearance or drinking quality of the juice;

(2) Not more than 10 percent free and suspended pulp;

(3) Practically no seeds or portions thereof that could not pass readily through round perforations of $\frac{1}{8}$ inch in diameter;

(4) Only such small seeds or portions thereof that could pass through round perforations of $\frac{1}{8}$ inch in diameter as do not materially detract from the appearance or drinking quality of the juice: and

(5) Other defects that are not more than slightly objectionable.

(c) (*C-Mfg.*) *classification*. If the reconstituted juice is fairly free from defects a score of 28 to 33 points may be given. Concentrated grapefruit juice that falls into this classification shall not be graded above U. S. Grade C or U. S. Standard, regardless of the total score for the product (this is a limiting rule). "Fairly free from defects" means that there may be present:

(1) Juice cells only in such amounts as do not seriously detract from the appearance or drinking quality of the juice;

(2) Not more than 12 percent free and suspended pulp;

(3) Practically no seeds or portions thereof that could not pass readily through round perforations of $\frac{1}{8}$ inch in diameter;

(4) Only such small seeds or portions thereof that could pass through round perforations of $\frac{1}{8}$ inch in diameter as do not seriously detract from the appearance or drinking quality of the juice; and

(5) Other defects that are not materially objectionable.

(d) (*SStd-Mfg.*) *classification*. Concentrated grapefruit juice that fails to meet the requirements of paragraph (c) of this section may be given a score of 0 to 27 points and shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

§ 52.3488 *Flavor*—(a) (*A-Mfg.*) *classification*. Concentrated grapefruit juice of which the reconstituted juice possesses a reasonably good flavor may be given a score of 34 to 40 points. "Reasonably good flavor" means that the flavor is typical of reconstituted concentrated grapefruit juice from properly processed and concentrated grapefruit juice; is practically free from traces of scorching, caramelization, oxidation, or terpene; and is free from off-flavors of any kind. To score in this classification the ratio of the Brix value to acid shall be not less than 6 to 1.

(b) (*C-Mfg.*) *classification*. If the reconstituted juice possesses a fairly good flavor a score of 28 to 33 points may be given. Concentrated grapefruit juice that falls into this classification shall not be graded above U. S. Grade C for Manufacturing or U. S. Standard for Manufacturing, regardless of the total score for the product (this is a limiting rule). "Fairly good flavor" means a normal flavor for reconstituted concentrated grapefruit juice, which flavor may be slightly caramelized or slightly oxidized or may possess traces of terpene, but is free from off-flavors of any kind. To score in this classification the ratio of the Brix value to acid shall be not less than 5.5 to 1.

(c) (*SStd-Mfg.*) *classification*. If the concentrated grapefruit juice fails to meet the requirements of paragraph (b) of this section a score of 0 to 27 points may be given. Concentrated grapefruit juice that falls into this classification shall not be graded above Substandard for Manufacturing, regardless of the total score for the product (this is a limiting rule).

EXPLANATIONS AND METHODS OF ANALYSES

§ 52.3489 *Explanation of terms and analyses*—(a) *Reconstituted juice*. "Reconstituted juice" means the product obtained by mixing thoroughly one part by volume of the concentrated grapefruit juice with a stated volume of water. For example, a dilution factor of "1 plus 6" means that to one part by volume of concentrated grapefruit juice 6 parts by volume of water are added to produce a reconstituted juice. In the absence of any declared dilution factor the product

is diluted with water to a Brix of between 10.5 and 11.5 degrees. Distilled water is used in reconstituting the product for testing flavor.

(b) *Reconstitutes properly.* "Reconstitutes properly" means that the concentrate goes into solution readily; and that in approximately 250 ml. of the reconstituted juice, after standing four (4) hours at a temperature of not less than 68 degrees Fahrenheit in a clear glass cylinder (approximately 1¼ inches in diameter), there may be a noticeable separation of suspended matter but any resulting zone of greater clarity shall be definitely turbid and not clear or transparent.

(c) *Acid.* "Acid" means the percent by weight of total acidity, calculated as anhydrous citric acid. Total acidity is determined by titration with standard sodium hydroxide solution, using phenolphthalein as indicator.

(d) *Brix value.* "Brix value" is the refractometric sucrose value determined on the thawed concentrate in accordance with the refractometric method for sugars and sugar products, outlined in the "Official Methods of Analysis of the Association of Official Agricultural Chemists," and to which the applicable correction for acid is added:

TABLE I—CORRECTIONS FOR OBTAINING BRIX VALUE¹

Citric acid, anhydrous (percent by weight)	Correction to be added to refractometer sucrose value to obtain degree Brix value	Citric acid anhydrous (percent, by weight)	Correction to be added to refractometer sucrose value to obtain degree Brix value
2.0-----	0.39	3.6-----	0.70
2.2-----	.43	3.8-----	.74
2.4-----	.47	4.0-----	.78
2.6-----	.51	4.2-----	.81
2.8-----	.54	4.4-----	.85
3.0-----	.58	4.6-----	.89
3.2-----	.62	4.8-----	.93
3.4-----	.66	5.0-----	.97

(e) *Free and suspended pulp.* "Free and suspended pulp" means particles of membrane, core, peel and other similar extraneous material that settle out on centrifuging by the following method:

(1) Skim floating fruit cells and pulp from the sample of reconstituted juice, and

(2) Fill graduated centrifuge tubes, of a capacity of 50 ml., with the skimmed reconstituted grapefruit juice and place in a suitable centrifuge. Adjust the speed according to diameter, as indicated in Table II, and centrifuge for exactly 10 minutes. As used herein, "diameter" means the overall distance between the bottoms of opposing centrifuge tubes in operating position. After centrifuging, the milliliter reading at the top of the layer of pulp in the tube is multiplied by 2 to give the percentage of pulp.

TABLE II

Diameter (inches)	Approximate revolutions per minute	Diameter (inches)	Approximate revolutions per minute
10-----	1,609	15½-----	1,292
10½-----	1,570	16-----	1,271
11-----	1,534	16½-----	1,252
11½-----	1,500	17-----	1,234
12-----	1,468	17½-----	1,216
12½-----	1,438	18-----	1,199
13-----	1,410	18½-----	1,182
13½-----	1,384	19-----	1,167
14-----	1,359	19½-----	1,152
14½-----	1,336	20-----	1,137
15-----	1,313		

¹ Source: "Refractometric Determination of Soluble Solids in Citrus Juices," by J. W. Stevens and W. E. Baier, from the Analytical Edition of Industrial and Engineering Chemistry, vol. II, p. 447, Aug. 15, 1939.

SCORE SHEET

§ 52.3490 *Score sheet for concentrated grapefruit juice for manufacturing.*

Size and kind of container.....		----
Container mark or identification.....		----
Label (including reconstitution factor).....		----
Liquid measure (fluid ounces).....		----
Net weight.....		----
Brix value of concentrate (corrected for acid).....		----
Anhydrous citric acid in concentrate (percent by weight).....		----
Brix value to acid ratio.....		----
Reconstitutes properly: (Yes) , (No)		----
Factors	Score points	
Color.....	20	{ (A-Mfg.) 17-20 { (C-Mfg.) ¹ 14-16 { (SStd-Mfg.) ¹ 0-13
Defects.....	40	{ (A-Mfg.) 34-40 { (C-Mfg.) ¹ 28-33 { (SStd-Mfg.) ¹ 0-27
Flavor.....	40	{ (A-Mfg.) 34-40 { (C-Mfg.) ¹ 28-33 { (SStd-Mfg.) ¹ 0-27
Total score.....	100	
Grade for manufacturing.....		

¹ Indicates limiting rule.

LOT INSPECTION AND CERTIFICATION

§ 52.3491 *Ascertaining the grade of a lot.* The grade of a lot of concentrated grapefruit juice for manufacturing covered by these standards is determined by the procedures set forth in the Regulations Governing Inspection and Certification of Processed Fruits and Vegetables, Processed Products Thereof, and Certain Other Processed Food Products (§§ 52.1 through 52.87; 22 F. R. 3535).

Dated: March 15, 1957.

[SEAL] FRANK E. BLOOD,
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